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STATISTICAL INDICES OF BUSINESS CONDITIONS

SUMMARY

Importance of studying statistical indices of business conditions, 522. — I. *Available Statistics*: Imports of merchandise, 524. — Exports of merchandise, 525. — Immigration, 526. — Bank clearings, 527. — Railroad gross earnings, 528. — Idle cars, 529. — New building, 530. — Commodity prices, 531. — Business failures, 531. — Stock market, 532. — Money rates, 534. — Bank loans, 534. — Pig iron, 535. — Copper, 536. — Print cloth and cloth margins, 537. — Silk, 539. — Tin, 539. — Hides and leather, 540. — Crops, 540. — Other items, 541. — II. *Some Methods of Business Forecasting*: Babson's Composite Plot, 543. — Brookmire's system, 552. — III. *Suggested Method of Obtaining Indices*: explanation, 554. — Need of more comprehensive statistical records, 562.

It is the purpose of this article to discuss the use of statistics for indicating the trend of business conditions. The first task is to ascertain what available statistics are symptomatic of business changes; the second to examine critically some of the methods by which statistics are being used at the present time for business forecasting; and the third to suggest an improved method. The subject is large and the work is still in an experimental stage; hence all conclusions must be considered tentative.

This subject obviously is not merely academic, but of large practical interest. Bankers, financiers, and the heads of manufacturing and mercantile enterprises must constantly study present conditions and future prospects. Many manufacturers, for example, buy raw materials and start manufacturing operations months before the finished goods are placed upon the market.

Plans must be made and production regulated according to the conditions which such producers expect to encounter at a later time. If they err in judgment, they are placed at a disadvantage which may prove serious. The maladjustment which occurs during a period of crisis may be disastrous. If manufacturers and merchants can be forewarned, fewer will be caught unawares and the severity of the shocks will be alleviated.

It is now generally agreed by students of the subject that the ups and downs of business prosperity are due to deep-seated influences, and business men are more and more giving up the long persisting notion that changes in business conditions are caused primarily by tariff acts, political happenings, or court decisions. More attention is being given to the symptomatic statistics currently published in the financial journals, trade publications, and daily papers. Some executives have statistical reports carefully prepared for their own businesses in order to make comparisons with previous periods and with the external statistics for other industries and trade.

The published statistics, altho inadequate for a complete analysis, furnish ample material for experimentation. Each set of statistics, however, requires careful examination; some are worthless. Moreover, of those statistics which appear to be reliable barometers of business changes, only those which are available daily, weekly, or monthly can ordinarily be used. A business man wishes current information; for him statistics which are a year old are more or less antiquated. And in studying long time fluctuations and the large trade cycles, annual figures are unsatisfactory because of the impossibility of determining to what extent the figures represent the antecedents and to what extent they represent the effects of important events happening

within the calendar or fiscal year. The annual statistics for the years 1873, 1893, and 1907, for instance, are not properly comparable in a study of crises, since the panic of 1873 began in the middle of September, that of 1893 in May, and that of 1907 in October. In the annual figures for these years the antecedents and the effects of the panics are thrown together in unequal proportions. In most instances a monthly basis of comparison seems to give the best results. With these considerations in mind we can proceed to an examination of the statistics.

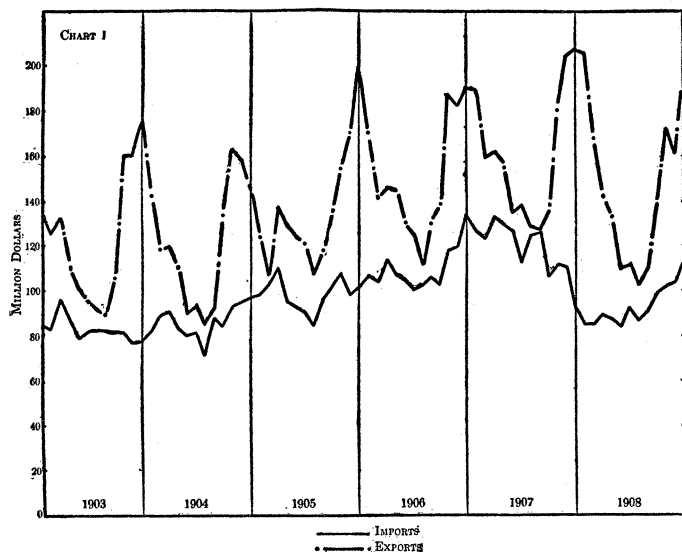
I. AVAILABLE STATISTICS

(1) *Imports of Merchandise.* The statistics for the value of merchandise imported into the United States correlate with business conditions.¹ During periods of prosperity more raw materials are bought for our manufacturing plants and the imports of finished goods for immediate consumption are also larger. During periods of depression, on the other hand, our purchases in foreign markets fall off. Altho the import statistics are affected by general changes in price level, short time comparisons can safely be made. Their most serious defect is in their susceptibility to the influence of tariff changes; but this does not destroy their worth as an index to general conditions.

In order to show the course of imports during a portion of a typical business cycle, the monthly statistics for the years 1903-08 have been plotted on Chart I. Final conclusions cannot, of course, be drawn from statistics for so short a period, but for experimental purposes these years seem to be representative. The

¹ Import and export statistics are published in the Monthly Summary of Commerce and Finance and in various financial journals.

general upward trend of the curve during the years of prosperity immediately preceding the crisis of 1907 is noteworthy. The effects of the crisis are shown in the ensuing decline. It is to be noted, also, that these statistics show a seasonal fluctuation, with a peak in March, due presumably to the importing of merchandise for the spring trade, a sag in the summer, and



another upward movement in the autumn caused by imports of merchandise for the holiday trade.

(2) *Exports of Merchandise.* For judging business conditions, the export statistics of the United States¹ are much less useful than the import statistics. The export statistics are, in themselves, less reliable because of the greater percentage of error in the returns; they are not scrutinized by the customs inspectors and there is no adequate check upon the accuracy of the exporters'

¹ The export statistics for Great Britain, on the contrary, are a particularly good index of conditions in that country, since the British manufacturers are so largely dependent upon foreign markets.

manifests. Furthermore, because of the predominance of raw materials and foodstuffs in our export trade, the volume of our exports depends largely upon conditions affecting demand from foreign countries. The movement does not necessarily indicate the strength or weakness of the domestic situation. The exports of manufactured goods tend to fall off with improvement in domestic demand and to increase during depression, when our manufacturers show their greatest interest in developing foreign trade. The course of the export trade, 1903-08, is also shown on Chart I. The marked seasonal fluctuation is due to the heavy exportation of raw cotton and other agricultural products during the late autumn and winter months.

Balance of trade statistics, which show the difference between imports and exports, seem to me to have little significance. There are so many invisible exports and imports that the balance of trade figures always involve a large element of uncertainty. How great is the foreign indebtedness upon which interest payments are due? Is the investment of foreign capital increasing or is the foreign indebtedness being paid off? What shipments of securities are being made? What transportation charges are to be paid? No record can be kept of all these transactions, which have just as much influence as the visible merchandise shipments upon foreign exchange rates and the movement of specie.

(3) *Immigration.* The statistics for immigration fluctuate in a general way with business conditions in the United States. An upward tendency was indicated, for example, during 1905, 1906, and 1907, and a marked reaction in 1908. The immigration figures are of especial interest to certain manufacturers, since they give some indication of the increase in the supply of unskilled labor. Their significance as a general index,

however, is lessened by the fact that the movement of immigrants adjusts itself only with more or less delay, according to information transmitted from this country to the foreigners before they leave their homes. The net immigration, that is the total number of immigrants less the number of emigrants, should be more significant; but the latter figures have been published only since July, 1907. A much more serious criticism of the use of immigration statistics as a business barometer is that they are influenced not only by conditions in the United States but by industrial, social, and political conditions in the countries whence the immigrants come. At best these statistics could not show a very close approximation to actual changes in business conditions in this country. At the present time, in consequence of the European war, all comparisons have become inconclusive.¹

(4) *Bank Clearings.* Because of the wide-spread custom of making payments by check, bank clearings give a fairly accurate index to the volume of business transactions. Altho influenced by general changes in prices, by bank consolidations, and by the spread of the check-using habit, bank clearings show approximately how much business is being done at any one time. As a business index, the bank clearings for the United States exclusive of New York City are more significant than the total clearings. The New York clearings, which constitute about one-half of the total clearings for the country, are so affected by the volume of speculative transactions upon the Stock Exchange that they should at least be considered separately. The clearings in other cities where stock exchanges are located are not a sufficiently large proportion of the total to necessitate

¹ Immigration statistics are currently published in numerous periodicals and also in the Monthly Summary of Commerce and Finance.

their exclusion. Bank clearings are not subject to wide fluctuations and do not indicate what is likely to take place in the future, but they do show in a general way what is taking place. The clearings statistics as reported by *Bradstreet's*, *The Commercial and Financial Chronicle*, and *Dun's Review* differ slightly in detail but approximately agree.

(5) *Railroad Gross Earnings*. Railroad traffic fluctuates with the amount of business being done in the community. As an index to the volume of traffic, since tonnage figures are not currently available,¹ railroad gross earnings are commonly used. Statistics for net earnings show the general financial condition of the roads, but are far less useful for general purposes than the gross earnings. The latter are in the same class as bank clearings, showing what is taking place but foretelling little of the future.

Because of the delay which occurs in securing reports from some of the companies, the total earnings for all the roads in the country cannot advantageously be used in studying business indices. It is necessary, therefore, to take the earnings for a representative group of roads. In the *Commercial and Financial Chronicle* statistics for the earnings of a group of roads are given monthly. These statistics are usually made up from preliminary returns and are thus, to some degree, subject to revision. The most serious difficulty however, which prevents the use, except for casual observations, of such compilations as those of the *Commercial and Financial Chronicle*, is that the make-up of the group continually changes. The number of roads included varies from month to month, yielding totals

¹ For a few years the American Railway Association has published a monthly bulletin, "Statement of Freight Car Balance and Performance," which gives, amongst other things, the ton miles of freight carried, but these bulletins appear several months late.

which usually can be compared only with the preceding month or with the corresponding month of the preceding year. Mr. Babson presents on his desk sheet a useful monthly table of the total gross earnings of ten railroads, always including figures for the same roads.

(6) *Idle Cars*. From January, 1908, to November, 1914, the American Railway Association issued semi-monthly reports on the number of idle freight cars. Since February 1, 1915, monthly reports have been issued. Altho these reports have probably been of assistance to railroad officials by furnishing a guide to traffic demands and by enabling them to secure a better balance of car supply, I am disposed to think that the statistics are much less reliable as a business index than has been commonly believed.

In the first place, the number of roads reporting has varied. On April 1, 1914, the number of roads reporting was 190; on June 1, 176; on October 1, 204; and on November 1, 192. Similar variations appear for other months. Further, in making any long time comparisons, the change in the capacity of the cars is also to be considered. But neither of these factors is so fundamental as the irregularity in the number of new cars added from year to year. The statistics for the number of freight cars idle cannot show the fluctuation in the volume of traffic and, hence, the amount of business done, when the number of cars available for service itself fluctuates irregularly. The number of idle cars depends not only upon the number actually in use, but also upon the number of new cars added and of old cars scrapped. The variations in the number of cars in service are shown by the following table, compiled from the bulletins of the American Railway Association. The wide divergencies in the number of new cars added during these years vitally affect the number of cars idle at any one time;

REVENUE FREIGHT CARS

	Cars Owned at End of Year	Increase or Decrease Dur- ing Year	Average Number Idle Per Month	Largest Number Idle	Smallest Number Idle
1908	2,077,764	+ 78,843	273,600	408,900	104,800
1909	2,049,015	- 28,749	187,800	321,800	-4,300 ¹
1910	2,162,444	+113,429	59,300	138,100	10,900
1911	2,197,399	+ 34,955	124,100	198,500	24,800
1912	2,207,516	+ 10,117	34,100	113,100	-50,600 ¹
1913	2,297,818	+ 90,302	42,200	79,400	2,200

¹ Shortage.

hence, without a statement each month of additions or withdrawals, idle car statistics should be used with extreme caution. The statistics as commonly published give us little clue as to the degree of change which has taken place.

(7) *New Building.* Numerous cities now have building regulations and require that a permit be obtained from a building commissioner before construction may be commenced. A record of these permits is kept, furnishing an index to building activity. The figures, to be sure, indicate only the plans at the time that the permit is issued and do not show over how long a period the building operations will extend or what cessations of construction occur. Nevertheless they should serve roughly as a general index.

The financial papers regularly publish compilations of statistics for new building, but not in a form for continuous comparisons. *Bradstreet's*, for example, has a monthly table of new building statistics, but the number of cities included varies from month to month, and occasionally the figures for some of the large cities are omitted, thus introducing a relatively large percentage of error. For this subject Mr. Babson also has a serviceable table on his desk sheet, which gives the value of the new building permits issued in twenty selected cities.

(8) *Commodity Prices.* Prices of commodities tend to rise during periods of prosperity and to fall during periods of depression. The most accessible general index for monthly changes in commodity prices is that published by *Bradstreet's*. The index number is in the form of the "total of the prices per pound of ninety-six articles," including breadstuffs, livestock, provisions, fruits, hides and leather, textiles, coal and coke, metals, oils, naval stores, building materials, chemicals and drugs, and miscellaneous. This method of computation permits such articles as silk cloth, which is light in weight and high in price, to exercise more influence on the totals than is exercised by the bulky staple commodities. And, so far as I know, no explanation has ever been given of the methods of finding the price per pound of eggs or per pound of oil. Ninety-six pounds of such an incongruous mixture is hard to imagine.

(9) *Business Failures.* The frequency of business failures tends to vary inversely with general business conditions. During periods of prosperity bankruptcies diminish. But as soon as depression sets in, the weaker firms, which have been able to hold on because of strong business conditions, fail in greater numbers. The statistics for business failures are a particularly sensitive index and show to what extent liquidation has progressed. They aid in forming a judgment as to when business recovery is to be anticipated.

Statistics for the number and liabilities of business failures are published by both *Dun's Review* and *Bradstreet's*. The figures from these two sources differ somewhat in detail but show the same general tendencies. The statistics for the total liabilities of failures are more commonly used than the statistics for the number of failures. The liability figures, however, occasionally show a sharp increase in consequence of a

single heavy failure which, from the general point of view, does not deserve the weight thus given it. Such experiments as I have made indicate that the statistics of failures by number correlate more closely with other business indices.¹ The statistics of business failures, like so many others, show a marked seasonal fluctuation, reaching their high point during the inventory months of December and January each year.

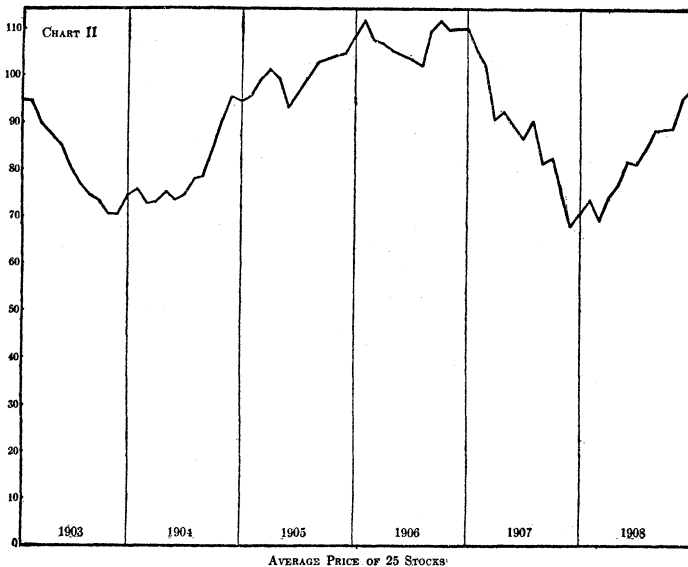
(10) *Stock Market.* Security quotations on the Stock Market fluctuate sensitively with every change and with every rumor of change in business conditions. The prices of securities rise during periods of prosperity owing to general optimism and high dividends. But when money rates begin to tighten, the stock market is one of the first indices to give warning of the coming crisis. Beginning in January, 1907, for instance, there was an almost constant decline until after the panic, as is shown upon Chart II. The curve indicates the changes in the average price of twenty-five stocks on the New York Stock Exchange.

Several stock market barometers, or indices of security prices, are published. I have used that of the *Boston Transcript*. Until the closing of the Stock Exchange in July, 1914, this barometer gave daily the changes in the average price of twenty-five stocks, including eighteen railroads, one public service company, and six industrials. These were, on the whole, well-selected and representative. The stock market index of the *Wall Street Journal* has been more commonly used for showing movements of security prices; but amongst the twelve industrials which it formerly included there was one quotation for United States Steel

¹ My tentative conclusion that the number of failures is the better index is supported also by Mr. D. R. Little, editor of *Dun's Review*, who states: "The number of failures reflects conditions more accurately than do the aggregate liabilities." *Moody's Magazine*, February, 1915, p. 79.

preferred, one for United States Steel common, one for United States Rubber preferred, and one for United States Rubber common. The weight thus given to steel and especially to rubber seems to have been unwarranted. Recently a quotation for General Motors has been substituted for United States Rubber preferred.

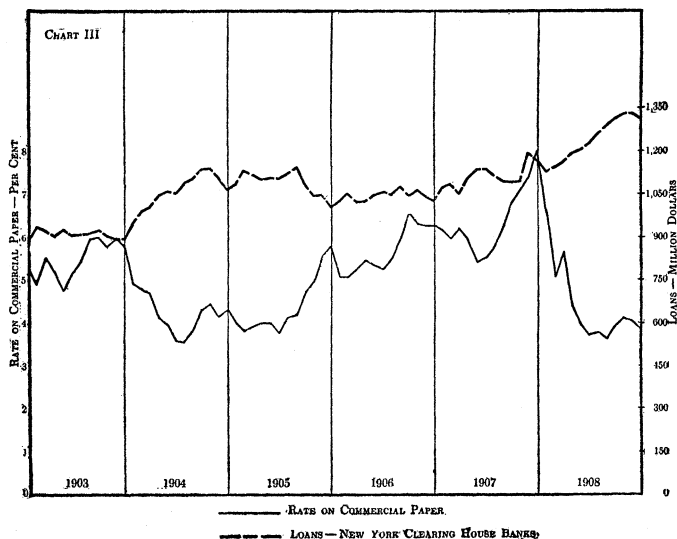
The average monthly figures which are plotted on the chart were obtained by taking an average of the Satur-



day quotations for each month. This average of the Saturday quotations varies little from an average of all the days in the month and is fully representative.

The volume of transactions upon the New York Stock Exchange is also of some value as a business index. Purely speculative influences or manipulation, however, may cause a rise or decline in the activity of the stock market, which does not correlate with actual changes in business prospects.

(11) *Money Rates.* The average rate on 60-90 day commercial paper serves as an index to money rates. The curve for money rates on Chart III has been plotted from the monthly averages given by Professor Mitchell in his *Business Cycles*.¹ This curve correlates closely with changes in business conditions, sagging at times of depression, rising gradually with increasing



prosperity, and then moving sharply upward during a crisis. It is one of our most useful indices.

(12) *Bank Loans.* Banking statistics in general have been so affected by the introduction of the new Federal Reserve system that few comparisons can safely be made with the past. Banking indices in the future can probably be worked out only after a new set of statistics has been accumulated. For purposes of illustration, however, the average loans of the New York Clearing

¹ Current figures for money rates are conveniently published in the Commercial and Financial Chronicle.

House banks may be taken. The course of these loans, as indicated by monthly averages of the weekly figures given in the *Commercial and Financial Chronicle*, is shown for the years 1903-08 on Chart III. It will be seen that the change from month to month is slight. In fact the relative stability of these figures during the period of rising money rates in 1906-07 gives them a peculiar significance, since it shows that the New York banks were regulating their loans with a view of just barely maintaining the required 25 per cent reserve against deposits.¹ When money rates were low, during depression, more funds were deposited in New York by the country banks and loans expanded. The banking system was exceedingly ill-adjusted for meeting an emergency.

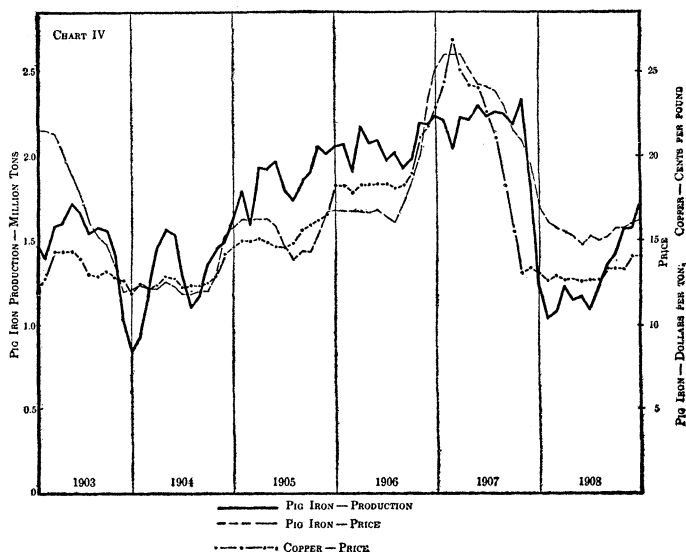
(13) *Pig Iron*. The classical business barometer is the iron industry. This industry is sensitive to changes in business conditions because of the fact that iron is used so largely for the construction of new machinery, new railway equipment, and recently for new building. The demand for iron falls off immediately when business depression begins, since additions and renewals cease. Construction work being postponable, the iron industry is one of the first to feel the effects of forced economy.

As is shown on Chart IV, the price and production of pig iron tend to move together. During periods of prosperity both production and price tend to rise, whereas after a crisis both fall. This same tendency is manifested by numerous other commodities. At times, however, price and production move in opposite directions, as, for example, when a considerable addition to the producing capacity has been made. For this reason it seems that both the price and production figures should be taken into account. So far as the years 1903-08 are

¹ O. M. W. Sprague, *History of Crises under the National Banking System*, p. 222.

concerned, attention is to be called to the rapid rise in price in the latter part of 1906 and to the decline which began in April, 1907. The price of pig iron broke in April, altho the panic did not occur until October. The production kept up until November. The statistics which were used were obtained from the *Iron Age*.¹

Another index to the conditions of the iron and steel industry is the unfilled orders of the United States



Steel Corporation, which were published quarterly till June, 1910, and since then monthly. The freedom with which cancellations are permitted in the steel trade lessens the value of these figures, but they may well be considered in connection with the prices of Bessemer billets or other steel products.

(14) *Copper*. This commodity is in the same class as iron and, since it is used for similar purposes, has become as sensitive a barometer. The greatest demand is,

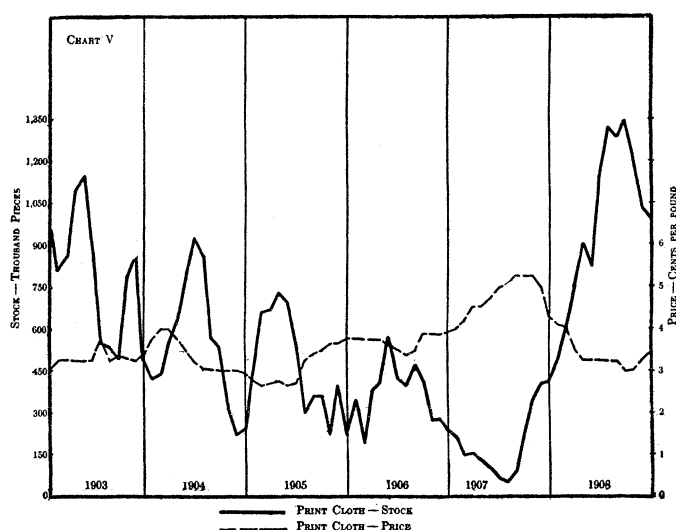
¹ The price quotations are for No. 2 Southern, Cincinnati.

of course, from the electrical industries. Statistics for the monthly production of copper in the United States were published by the Copper Producers' Association from January, 1909, to June, 1914. This period is too short to permit comprehensive comparisons to be made. The statistics for the average price of electrolytic copper, as given by the *Engineering and Mining Journal*, for 1903-08 are plotted on Chart IV. The general movement of the price of copper was similar to that of the price of pig iron, but the former broke in March, 1907, one month earlier than pig iron.

(15) *Print Cloth*. For the textile industries and the dry goods trade few indices are now available. Price quotations and weekly statements of the sales of print cloth in Fall River are published in the *New York Journal of Commerce* and elsewhere. These sales statistics are not strictly accurate and there is no check to show the percentage of error. They should indicate roughly, however, the general condition of the trade in cotton cloth. Under ordinary conditions the sales are in part for future delivery, the deliveries extending over two or three months, and after delivery the cloth must be converted, that is printed. Hence the volume of sales indicates the outlook in the dry goods market.

The price figures represented by the curve on Chart V are the averages of the Monday quotations for 28 inch, 64 x 64 print cloth. The activity of the mills and the strength of the market in 1906-07 are reflected in the rise in price, this rise holding until after the panic actually occurred. The sales had been heavy in 1906 and the first half of 1907, and fell off in July of the latter year only because the mills were getting so far behind on their deliveries. In fact premiums were being offered to the mills on orders for immediate delivery.

This demand for cotton cloth had nearly wiped out the stocks of cloth on hand in the leading primary markets,¹ as is indicated by the curve for stocks of print cloth given on Chart V. These statistics are perhaps not as accurate as those for sales, but undoubtedly show the general situation. The market decline to the low point in July, 1907, is especially significant when considered in connection with the price curve. The



accumulation of stock after the panic shows that it was then that over-production occurred, and has a strong bearing upon the general theory of crises.

Another index of the condition of the cotton manufacturing industry is the margin between the price of raw cotton and the price of cloth. This is found by deducting from the price of cloth the cost of the quantity of raw cotton required to manufacture that cloth.

¹ The primary markets are New York, Boston, Providence, and Fall River. These statistics were compiled from the tables in several editions of A. B. Shepperson's *Cotton Facts*.

This margin covers the manufacturing expense and the manufacturer's profits. In the months preceding the panics of 1893 and 1907, there was in each instance a sharp rise in this margin.¹ The margin reached its lowest point when the depression was most severe.

(16) *Silk*. The condition of the silk industry should be shown approximately by the imports and prices of raw silk. All of the raw material used in the industry in this country is imported, and the importations adjust themselves fairly closely to the demand from the manufacturers. In fact this is probably a better index to the industry than any figures for production would be, since the products are highly diversified. During the months preceding the panic of 1907 relatively large imports were received and there was a marked rise in price, the highest point being reached in May, 1907, after which a fall began.²

(17) *Tin*. As another illustration of the use of statistics of imports and prices for a raw material not produced in the United States, tin may be taken.³ The domestic production of this commodity is negligible. The imports of tin, like those of silk, fluctuate somewhat irregularly, owing probably to the irregularity in the arrival of the ships in which the material is carried. But they were heavy in 1906 and the first part of 1907. The price of tin also showed a striking rise during the boom period preceding the panic of 1907, with a slight break in June and the beginning of a sharp decline in August of that year.⁴

¹ A chart showing this margin for the years 1881-1910 is given in my book, *The Cotton Manufacturing Industry of the United States*, p. 174.

² The statistics for imports are published in the *Monthly Summary of Commerce and Finance*, and the price statistics in the *New York Journal of Commerce*.

³ Price statistics from *Engineering and Mining Journal*.

⁴ The statistics from which these conclusions for tin are drawn were collected by several students in my class in *Business Statistics* in the Harvard Graduate School of Business Administration. Other students have collected figures on cotton cloth prices and margins and on the prices of hides and leather, which have been of assistance.

(18) *Hides and Leather.* For the shoe manufacturing industry no statistics of production, sales, or prices are now to be had, and for hides and leather the only figures are for prices.¹ The most sensitive price statistics appear to be the quotations for Packers' No. 1 hides and Buenos Aires sole leather. Each of these fluctuates with the conditions in the industry, and in 1905 and 1906 both showed a general upward movement which culminated in January and February, 1907. The drop which occurred in the following months presaged still greater weakness in the future.

One complex phenomenon stands out clearly in a study of the price movements for these various commodities. The breaks in some instances preceded the panic by several months, whereas for other commodities the prices held up till the panic actually occurred. Through a more exhaustive study it may be possible to arrive at definite conclusions with reference to the laws of sequence. In other words, a correlation may be established which will serve as an accurate index to events likely to follow in the future. For this purpose an investigation of the changes in the prices of individual representative commodities will clearly yield better results than a study of a composite index number of prices.

(19) *Crops.* The prosperity of the country is dependent in no small degree upon the agricultural crops. Abundant crops mean better supplies of food for the population and more raw materials for the manufacturers of flour, cotton cloth, and other products. They also mean more purchases by the farmers of commodities of all sorts and more freight for the railroads. Unless the agricultural sections of the country are prosperous business is inevitably dull.

¹ Dun's Review; Shoe and Leather Reporter.

So far as my investigations have gone, it appears that the best index to the farmer's prosperity is the average yield per acre. True, the price which the farmer receives is an important factor, and is not to be neglected. But the higher prices in years of short crops are beneficial to only a portion of the farming community. If some farmers receive relatively large amounts for their crops while others have their incomes seriously curtailed, the gross amount of farmers' purchases is no greater and the distribution is not normal. An even distribution is most beneficial to business in general.

There is the additional difficulty, when attention is given chiefly to the prices for agricultural products, of ascertaining what proportion of the crop is sold at each price. Just how much the farmers receive is more or less in doubt. Further, production is to be watched with caution, because it does not adjust itself to price changes in the same way as the production of pig iron, for instance. The forces of nature influence the agricultural yield. Altho further investigation is needed to prove conclusively whether the yield per acre or the total yield and the price statistics are most significant, crop statistics of some kind clearly ought to be considered in any study of business indices.

(20) *Other Items.* In addition to the above indices there are several others for which statistics may be had after some delay or for which incomplete statistics are available. Unemployment statistics are a valuable index, as is proved by the report issued from month to month by the British Board of Trade. In this country, unfortunately, no unemployment statistics are currently available. The Massachusetts Bureau of Statistics has published quarterly statements on unemployment since March, 1908. The New York Bureau

of Labor keeps monthly records of unemployment, but up to the present time these have been published only after so long an interval as to give them little more than historical interest.

For lumber some scattered statistics of production and shipments are published and also some price statistics. Unfortunately the quotations for lumber prices in trade papers are not altogether reliable. Judging from the statistics given in Part IV of the Bureau of Corporations' *Report on Lumber*, accurate price statistics for certain grades of lumber, especially for the common grades of fir and pine, would be as valuable indices as are the price statistics of other commodities.

Newspaper and book-paper prices are regularly published, but they too seem to be unreliable. Furthermore, paper is sold largely upon contracts extending over a year or more, so that the prices are somewhat inflexible. The American Pulp and Paper Association has been collecting reports of production and these were for a time published.¹ From such material as is available, it appears that the paper trade is sensitive to fluctuations in general business conditions. The volume of advertising which the newspapers and magazines carry varies with business prospects and the size of the publications is thereby affected. When business is brisk there is also a greater demand for paper for posters, circulars, advertising booklets and for other purposes. For advertising itself some statistics are available,² but not enough to be of much service as yet.

The National Association of Wool Manufacturers began in December, 1913, to collect quarterly reports of the number of cards, combs, spindles, and looms in operation and idle in the woolen and worsted mills. If these reports are continued, they should prove

¹ In the *Paper Trade Journal*.

² *Printers' Ink* gives monthly tables.

valuable indices, even if they are not upon a monthly basis.

It is apparent, I think, from what has been stated in the foregoing paragraphs, that there is now abundant material for experimentation on this subject of business indices. In order to use these statistics properly some common basis of comparison is needed, which will not only provide a common denominator but which will also take into account the seasonal fluctuations. It is of vital importance to know whether an increase or a decrease represents a normal seasonal fluctuation or whether it represents a fundamental change in conditions. We now turn to a critical examination of the attempts which have been made to provide such a common denominator and to construct business barometers.

II. SOME METHODS OF BUSINESS FORECASTING

The systems of business forecasting which are now in use are open to criticism in two directions: (1) their selection of statistics and (2) their statistical methods. Such criticism does not imply a lack of appreciation of the useful service done by these "barometers." Their pioneer work has been especially valuable in creating amongst business men a more wide-spread interest, and a broader recognition of the fact that crises and depressions are not caused by politics or accidents.

(1) *Babson's Composite Plot.* One of the best known business barometers is that prepared by Mr. Roger W. Babson, who also publishes a very serviceable compilation of monthly statistics on his *Desk Sheet*. Statistics for twelve subjects are used in the preparation of this barometer, — (1) immigration, (2) new building, (3) liabilities of business failures, (4) bank clearings, exclu-

sive of New York City, (5) Bradstreet's index number for commodity prices, (6) surplus reserves of the New York Clearing House banks, (7) foreign money rates, (8) domestic money rates, (9) conditions of crops, (10) idle cars, (11) political factors, (12) stock market conditions. The first four are grouped together as representing mercantile conditions, the second four as representing monetary conditions, and the third four as representing investment conditions.

From what has been said in the preceding pages it is evident that these statistics vary greatly in significance. Immigration, for example, is a much less reliable index than bank clearings or domestic money rates, and idle car statistics are altogether unsatisfactory. Furthermore, the methods of obtaining statistics for three of the subjects are open to serious criticism. In order to get an index for foreign money rates the official rates of the Bank of England, Bank of France, and Reichsbank are averaged. Such an average does not seem to me statistically sound, since the policies of these banks are by no means the same. The Bank of France, for instance, sometimes puts a premium upon gold deliveries instead of changing the discount rate. For crops only corn and wheat statistics are used. The cotton crop, which provides about one-fourth of our exports and affects so large a section of the country, is not included. The estimated crops of corn and of wheat, in bushels, are added together, despite the fact that in this way corn is given a weight four times that of wheat, which sells at considerably higher prices per bushel and is more of a cash crop. Corn should be given a weight not over twice that of wheat. As previously stated, the figures for total production seem to me less satisfactory for this purpose than the average yield per acre. "Political factors," finally, cannot be measured statistically,

and to include such a subject indicates a startling disregard for scientific method. An index on such factors could, at best, be only guess work.

Both Babson's selection of subjects and his treatment of the figures are open to criticism. If only twelve subjects were to be used in preparing the business barometer, these twelve should have been the most sensitive and the most trustworthy. Babson's selection seems to me to fall far short of that requirement. It is especially notable that no strictly industrial statistics are used. The selection of subjects, however, is open to less criticism than the methods of manipulating the statistics.

In order to secure a common basis of comparison for these diverse denominations and to eliminate the effects of seasonal fluctuations, a set of intermediary "scale" figures was worked out.¹ Taking immigration for illustration, a table of scale figures was prepared for each month. For January the highest and lowest figures for the month of January during the years of 1898-1908 were found, — 18,300 in 1901 and 56,200 in 1905. The range between these two figures was taken as equal to 100 points. The difference between the two actual figures (37,900) was divided by 10. By adding this quotient, 3,790, to 18,300, the point ten "degrees" above the lowest was found, and by repeating the process the entire scale was built up in arithmetical progression until it reached the highest actual figure, 56,200. The same scheme was used in working out a scale for each month. For February the lowest and highest figures for immigration in the month of February, 1898-1908, were found and a 100 point scale similarly ascertained, and so on for the other months. Thus there is a separate scale for each subject for each month.

¹ "Preparing the Composite Plot," Babson's Reports, 1912.

To quote Mr. Babson's own explanation:¹ — " We then arrange the scale figures in column, placing zero over the column whose average approximates most closely to the average conditions of the years 1903 and 1904, — that is the depression following the 1903 panic. This date is taken arbitrarily as the starting point of the Barometer. We then place our index figures in series to the left and right of zero. If the volume of business increases so as to go beyond the scale, higher scale figures are added, using the same arithmetical progression as at first, so that the actual condition of the years 1898–1908 serves as a *constant* by which to compare succeeding years. Scales similar to this one on immigration have been prepared for all subjects."

As an example of the way in which the immigration scales for January, February, and March are worked out the following table is given.

	Jan.	Feb.	Mar.
+60	56,200	68,700	139,100
+50	52,410	64,170	128,440
+40	48,620	59,640	117,780
+30	44,830	55,110	107,120
+20	41,040	50,580	96,460
+10	37,250	46,050	85,800
0	33,460	41,520	75,140
-10	29,670	36,990	64,480
-20	25,880	32,460	53,820
-30	22,090	27,930	43,160
-40	18,300	23,400	32,500

On each scale the range would not necessarily be from - 40 to + 60, but in every case it would have a range of 100 points, with the lowest actual figure for that month, 1898–1908, at the bottom, the highest actual figure at the top, and " zero " fixed by the figures for 1903–04.

¹ " Preparing the Composite Plot," Babson's Reports, 1912.

This scale is then used for determining the index figure for the current month. For January, 1914, for example, the number of immigrants was 44,700. This evidently falls between + 20 and + 30 on the January scale for immigration. 41,040 corresponds to + 20 on that scale. Subtracting from 44,700, the difference is 3,660. The last figure is then divided by 379, which is the value of each degree on the scale. The quotient, 9.6, is added to + 20, giving an index of + 29.6 for immigration in January, 1914.

An index number is similarly worked out for each of the subjects, by finding the scale figure to which the actual figure for the month of January, 1914, corresponds. Each month in each year is handled in the same way.

For business failures, surplus reserves, and idle cars, inverted scales are used, since these subjects vary inversely with business conditions. But for surplus reserves, when the figures fall below a certain point, weakness rather than strength is indicated, hence, to quote Mr. Babson again, "below \$5,000,000 this subject is put upon what we call a *deficit* scale, declining quickly to zero as the reserves are wiped out and reading - 66 for a deficit of \$50,000,000, as in November, 1907." Similarly "when money rates for the best commercial paper reach about 5 per cent — an average occurring only in a period of excess loans — the scale figures begin to work downward again, for the 'lack of confidence' shown by the high rate overshadows the 'excess of business' feature shown by a majority of other subjects. On this panic scale the index moves to - 60 rapidly when rates advance from 5 per cent to 8 per cent or above." Both of these scales are purely arbitrary adjustments.

Having found the index for each of the subjects for a certain month these figures are averaged, giving double

weight to bank clearings, domestic money rates, and the stock market index. The final figure thus obtained is the index to business conditions. Before undertaking to examine the use which is made of this summary figure, let us make a critical examination of this method of securing index numbers.

In the first place, it is evident that the index numbers are in no sense percentages. Since the lowest point is not zero, they do not show even the percentage of the range above the lowest points. The index numbers depend upon this range and upon the location of the zero point. The question of whether or not 1903-04 can fairly be assumed to have been representative of normal conditions for all of these subjects is of minor importance. The heart of the problem is the method of determinating the range upon which the scale figures are based.

The use of the range between the highest and lowest figures for each month over a ten-year period as a base for the scale figures presupposes that there were no abnormally high and no abnormally low figures in any instance. If in any month one subject showed an exceptionally high figure because of extraordinary circumstances which did not affect the other subjects and which had no influence in other months, the range was thereby made abnormally wide. The scale figures and the index numbers determined from such a range are not properly comparable with those for other subjects and for other months. The range, in other words, may be said to have been placed at the mercy of the extraordinary events during this ten-year period. As a matter of fact, a little experimenting will show that the exclusion of a single high figure, using instead the one next in order, materially modifies the scale figures for any subject.

Take the liabilities of business failures, which showed as its high point \$100,045,440 in October, 1907. The greatest force of the panic was then felt by that subject. Altho in the following months failures were heavier than prior to the panic, they by no means exceeded the averages for the respective months to anything like the same degree as in October. Consequently the scale for liabilities of business failures for October is not fairly comparable with the failures scales for the other months. Again, as has already been shown, the approach and the effects of the crisis were not felt synchronously to the same degree by all the subjects. Domestic money rates, for example, reached their highest point in December, 1907,¹ and security prices their highest point in September, 1906. A brief examination of the statistics for the other subjects will show that there was no such correlation in their fluctuations as to warrant the use of this method of establishing a common basis of comparison or to justify the averaging of the index numbers.

The summary index figure which is obtained by averaging the index figures for the twelve subjects does not, therefore, indicate the percentage of anything, nor does it show the percentage change from month to month. It merely gives the average of the figures obtained by the use of this questionable range-scale method.

The summary figure is obtained solely for making the Composite Plot. The theory which underlies the Composite Plot is that in business, as in the physical sciences, "action and reaction" are equal and that the summary index figure for the twelve subjects measures business

¹ From the explanation which has been given of the "deficit scale" used for money rates when they rise above 5 per cent, the latter figure must have been taken as the maximum in fixing the scale. If this same plan were to be commonly followed, the scales would become entirely arbitrary, depending upon the judgment of the person who made them out.

action and reaction so accurately that we can foretell the amount of depression which will compensate for a preceding period of prosperity.

Tho the rythmic movement in trade cycles is not to be disputed, it is more than doubtful whether there is a law applicable to our ultra-complex economic life which causes an exact balancing of action and reaction. Some forces may tend to counterbalance each other at one time, and yet not at another. Furthermore there may be long delays in the manifestations of the resultants of certain forces. And even granting that a definite law of this kind is at work, are the twelve subjects for which statistics are used by Mr. Babson so representative of all business conditions and forces that we can base hard and fast conclusions upon them? Are the statistics themselves so free from error that they can serve as exact measures? Is the method of reducing these statistics to a common basis so scientifically accurate that the final composite index number deserves confidence? It is obvious that each of these questions must be answered in the negative.

Finally, the Composite Plot itself is to be considered. To obtain this the summary index numbers are plotted as for an ordinary graph, with the additional provision of a line of "normal growth," — the X-Y line. This X-Y line is an essential part of the Composite Plot, since some of the subjects tend to show an increase from year to year in consequence of the growth of the country. If it were not for the growth of the country, the curve plotted from the index numbers would fluctuate above and below a straight line parallel to the base line. The line of "normal growth," however, must move upward in order to show a proper balance.¹

¹ It should be noted that for five of the twelve subjects there is no normal growth, but only fluctuations around the constant level. Money rates, for instance, do not necessarily increase with the growth of the country.

As the summary index numbers are plotted upon the chart, a part fall above the X-Y line and a part below. There develop, consequently, a series of areas bounded by this curve for summary index numbers and by the X-Y line. These areas alternate above and below that X-Y line. Those above are positive and represent action; those below are negative and represent reaction. Since action and reaction are to be equal, the positive and negative areas must be equal. They are not regular in depth or breadth but equal only in area. For a current month this Composite Plot is assumed to show the position in which the business world is with reference to the business cycle. From this Plot, it is assumed, one can judge how much positive or negative area can be expected to develop before a change sets in. The Plot does not indicate in any way whether this development is likely to be rapid or slow, whether the "reaction" will be sharp and quick or slow and long.

Obviously the relative size of the areas above and below the X-Y line depends upon where that line is placed. When this Plot was first published, the X-Y line was straight. Its direction had been determined by carrying the Plot back over several years and drawing the line of normal growth in such a way that equal positive and negative areas would be shown.

Until January, 1913, the line continued to be straight, running diagonally at an angle of about ten degrees from the horizontal. Events, however, were causing unequal areas to develop and a readjustment was necessary. Modifications in the direction of the X-Y line were introduced, causing long, irregular fluctuations. Had the direction of the line remained unaltered, the appearance of the plot at the present time would be quite different. Now the direction of the X-Y line is changed as occasion requires. To quote from an ex-

planation issued by the Babson Statistical Organization: "After considerable study of the different subjects, it seems clear that the subject most successful as an indicator . . . is the volume of bank clearings for the country, excluding New York. . . . But as it is always dangerous to use one subject alone and especially a subject reflecting surface movements, it is necessary to take bank clearings as an indicator only, and to check conclusions based upon it at the end of each year by all the important barometers of wealth which are reported annually, and again at the end of each cycle, as shown by the areas of the Composite Plot. *Therefore, on our Composite Plot, the line X-Y is now drawn so as to make the areas equal,*¹ with special attention to the cycles."²

In other words, without offering a detailed explanation, the X-Y line is now adjusted from time to time according to bank clearings, one of the twelve subjects used in obtaining the barometer figure, and, in the long run, the line is drawn so as to make the positive and negative areas equal. In last analysis therefore, the whole scheme turns upon the X-Y line, which is readjusted more or less in accordance with what the manipulator thinks that the chart ought to show.

(2) *Brookmire's system.* The other system of forecasting which I shall examine here is that of the Brookmire Economic Chart Co. In this system there are three composite indices and no single plot. No attempt is made to lay down rules that the indices must always react upon each other in the same way or that any hard and fast law is to be followed. It is recognized that many forces are at work which cannot be expressed statistically but which must be taken into consideration in judging the probable course of business conditions.

¹ The italics are mine.

² "How the Line of Normal Growth 'X-Y' of the Composite Plot is Located," Babson's Reports.

In obtaining the Business Index the following statistics are used: ¹ total bank clearings in the United States, bank clearings exclusive of New York City, commodity prices, railroad gross earnings, new building (70 cities), pig iron production, pig iron price, price of Bessemer billets, unfilled orders of United States Steel Corporation. For the Stock Market Index, the average price of twenty railroad stocks and twelve industrials is computed; and for the Banking Index, use is made of loans, deposits, reserves, ratio of reserves to loans, and rate on commercial paper.²

The method of reducing these statistics to a common basis has been explained by Mr. Brookmire as follows: "In combining these banking indices it was necessary to create a common scale on which to place each index before averaging them all together. I decided to take a period beginning with 1900 and find the average figure for each index taken. This 'normal' or 'zero' point is the place where the points of each index used fall half above and half below the normal line. For example, the 'normal' or 'zero' point of the loans to deposits graph is 98.5 per cent for the period 1900 to 1912. This 'normal' or 'zero' point is the starting point of the new combined index."³ That is, the median is apparently used as the standard in working out the scale.

In criticizing this system of forecasting, attention is first to be called to the limited number of subjects included and to the omission of all crop statistics. But, here again, the main criticism lies against the technical methods used in making adjustments for seasonal fluctuations and for normal growth. For those statis-

¹ J. H. Brookmire, "Financial Forecasting," *Moody's Magazine*, January, 1914, p. 8.

² *Ibid.*, June, 1913, p. 444.

³ *Ibid.*, June, 1913, p. 444.

tics which manifest a seasonal fluctuation, the seasonal variation is calculated and, before the index is prepared, the statistics are "compensated" in accordance with these calculations. Owing to the nature of the statistics a certain percentage of error must be involved in these calculations and compensations.

As regards "normal" growth, the rate of annual increase in those figures which are influenced directly by the progressive advance of the country is also calculated, and the figures are "stepped down" before using.¹ Since so many diverse forces affect these statistics, a rate of "normal" annual increase can, at best, be only an approximation; whereas the system presumes to make a nice adjustment. Obviously both the "compensation" and the "stepping down" are somewhat arbitrary, depending more or less upon the judgment of the person preparing the index. A system in which the personal element is dominant, as in this case, is always open to doubt. It does not tell its whole story upon its face.

III. SUGGESTED METHOD OF OBTAINING INDICES

It is apparent, from the criticisms which have been made in the preceding section, that one of the fundamental problems in preparing indices of business conditions is to secure a common denominator which will allow for normal growth and seasonal fluctuations without leaving any of the adjustments or compensations to personal judgment or manipulation. To achieve this end I suggest the following method.

For each subject let a monthly index number be obtained by dividing the actual figure for the month by the average for that month during the ten preceding

¹ J. H. Brookmire, "Financial Forecasting," *Moody's Magazine*, June, 1913, p. 444.

years. This is illustrated by the following table, which gives the ten-year monthly averages, the actual figures, and the index numbers, for one item, namely bank clearings, exclusive of New York City; the period covered being the years 1913 and 1914. The figures for clearings are from *Bradstreet's*.

BANK CLEARINGS

		Base (Average for Month, 1903-12) ¹	Actual Figures ¹	Index Number
1913,	January	4,903	6,739	137
	February	4,142	5,670	137
	March	4,728	6,100	129
	April	4,612	6,090	132
	May	4,565	6,025	132
	June	4,549	5,831	128
	July	4,639	6,080	131
	August	4,350	5,492	126
	September	4,407	5,841	132
	October	5,162	6,859	133
	November	4,913	6,157	125
	December	5,041	5,536	130
		Base (Average for Month, 1904-13) ¹		
1914,	January	5,193	6,687	129
	February	4,392	5,500	125
	March	4,985	6,263	126
	April	4,794	6,218	130
	May	4,732	5,797	122
	June	4,767	5,968	125
	July	4,872	6,180	127
	August	4,577	5,233	114
	September	4,657	5,269	113
	October	5,460	5,981	110
	November	5,180	5,551	106
	December	5,321	5,979	112

The ten-year average for the month of January, 1903-12, was \$4,903,000,000; the actual amount for January, 1913, \$6,739,000,000. Dividing the latter by the former, an index number of 137 is obtained. This

¹ In millions.

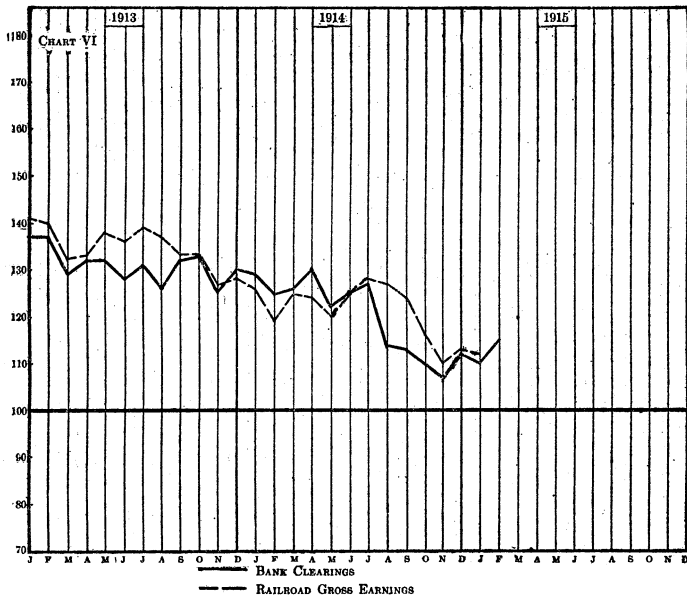
means that in January, 1913, bank clearings were 37 per cent above the ten-year average for that month. The ten-year average for February, 1903-12, was \$4,142,000,000 and the actual amount in February, 1913, \$5,670,000,000, which also gives an index number of 137. Similarly for each month in 1913 the actual number is divided by the average for that month during the years 1903-12. For January, 1914, the actual amount, \$6,687,000,000 is divided by \$5,193,000,000, the ten-year average for January, 1904-13; and a similar base is used for the other months in 1914.

By means of this moving base the comparability between the index number for December, 1913, and that for January, 1914, is maintained. The basic months used in obtaining the index for January, 1914, bear the same relation to the basic months used in obtaining the index number for December, 1913, that the latter bear to the basic months for November, 1913. By using the ten-year monthly averages, seasonal fluctuations are automatically allowed for, and by always taking the ten preceding years as the base, provision is made for normal growth.

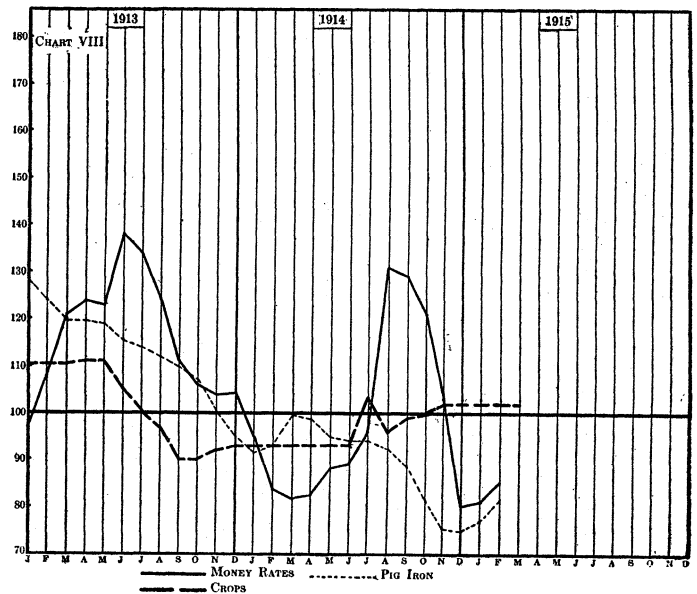
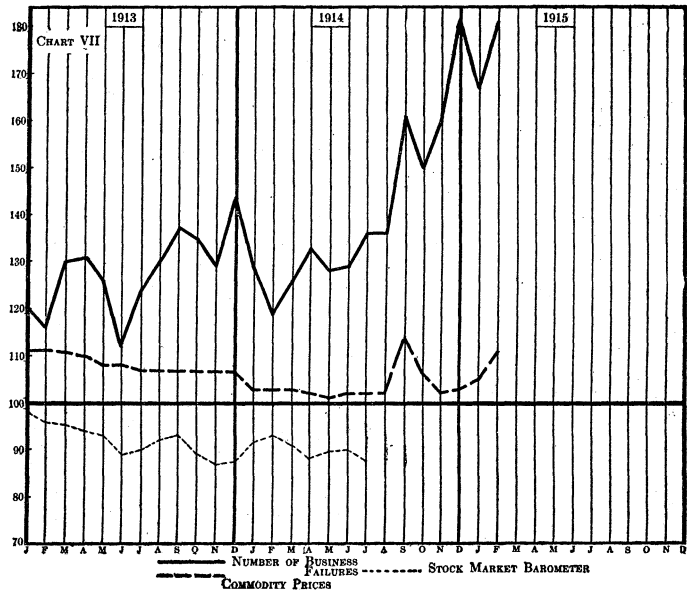
The ten-year monthly average represents a normal standard, whether the figures tend to increase or to fluctuate about a constant level. For the purpose in hand this moving base seems superior to a fixed base and certainly it is more reliable than any arbitrary scale. It may prove advisable to use a fifteen or a twenty-year period in determining the bases, in order to reduce the influence of exceptional years. The principle, however, will remain the same. The ten-year period facilitates the use of those statistics which have not been collected for a longer time and, from numerous experiments which I have made with a wide variety of statistics, the ten-year period appears to be satisfactory.

In plotting the index numbers I have in each case represented 100 by a heavy line. This is the norm shown by the ten-year monthly averages. As long as a curve remains above this line, the figures are above normal, that is, above the ten-year average for the corresponding months.

The general method is illustrated by Charts VI, VII, and VIII, which show the course of the index numbers for bank clearings, railroad gross earnings, number of business failures, commodity prices, stock market,



money rates, crops, and pig iron. The war has brought hardships untold to the statistician who wishes to study the indices of business conditions. It has led to the discontinuance of certain statistics, and a change in the form of others. The Copper Producers' Association, for example, ceased publishing figures for the production of



copper. The *Boston Transcript* reduced the number of stocks used in obtaining its barometer from twenty-five to twenty, and several other sets of statistics were upset. The charts here represented are only a part of those which have been worked out in my experiments, but they will suffice to explain this method of presentation.

The bank clearing statistics used are those published monthly by *Bradstreet's* for the United States exclusive of New York City. The statistics for the number of business failures and also the index number for commodity prices are from *Bradstreet's*. Railroad gross earnings are for ten roads as given on Babson's desk sheet. The stock market barometer is that of the *Boston Transcript*. Money rates are represented by the average monthly rate on 60-90 day commercial paper in New York. For each of these subjects the index numbers from which the curves were plotted were obtained by dividing the actual monthly figures by the averages for the corresponding months during the ten preceding years.

For pig iron an index number for production was worked out upon the same general plan. Then in the same way an index number for price. In order to get a single index number for pig iron which should show the net result of changes both in production and in price I have averaged the production index with the price index. For example, the production index for January, 1913, was 157.5, the price-index 99.5, and the average index, therefore, was 128.5. It may prove better to use these two indices separately, but this combined index seems worth trying and watching.

For crops the index number has been prepared first for winter wheat, spring wheat, corn, and cotton. Other crops might be added, but these serve to represent the conditions in the great agricultural sections of the country. During the growing season the condition

reports of the United States Department of Agriculture are used. The index number for each of these crops for each month during this season is found by dividing the condition figure for the month by the ten-year average for the same month. When the final report of the Department of Agriculture is issued the yield per acre is taken as the best index and the index number for each crop is found by using as a base the average yield per acre for that crop during the preceding ten years. From December, when the final report of the Department of Agriculture is issued, till the new condition reports begin in the following spring, the index numbers for the crops remain constant. These constant index numbers during the winter and early spring give a proper representation of conditions, since the influence of the crops on the markets is practically without change during that time.

After the index for each of these crops was prepared, a weighted average was taken.¹ Winter wheat was given a weight of one, spring wheat one, cotton two, and corn four. This weighting corresponds roughly to the relative total value of each of these crops. The final weighted average was taken as the crop index, which was to represent trade conditions in the leading agricultural districts.

Looking at the charts here given, it is apparent, I think, that they fairly represent some of the conditions prevailing during this period. The indices for bank clearings and railroad gross earnings (Chart VI) correlate closely and show the general trend of events. The number of business failures (Chart VII) has been relatively high throughout, jumping sharply upward after the outbreak of the war. As regards the future, in

¹ Further experiments are being carried on to ascertain whether an average index or a separate index for each crop is more satisfactory.

view of the length of time during which failures have been relatively heavy, this is a favorable indication; there has been an unusually severe liquidation and the weak spots must have been pretty thoroly cleaned out. The price index tended to fall until the war came. The stock market showed continued depression.

Chart VIII is, perhaps, most helpful in interpreting the general course of business during these months. The rise in money rates in the early part of 1913, was due to the Balkan war. This was probably one of the primary causes of the business depression which began in the United States early in 1913. The decline later in the year was accompanied by a brightening of business prospects in the fall of 1913. Most industries showed an appreciable improvement about September of that year but this improvement did not hold. The sharp decline in crop prospects which began in June, 1913, at just the time when the index for money rates was at its highest point accentuated the depression which was setting in and helped to cause the slight crisis of that month. The relatively poor crops, as indicated by this curve, show why there was not more recovery in the fall and winter of 1913 and why business was depressed during the entire spring of 1914. Since other factors were favorable and the crop outlook brighter in the summer of 1914 conditions appeared ripe for at least a moderate business recovery. The breaking out of the European war, however, suddenly tightened the money market and upset the whole business world.

The pig iron index is added to this chart, not as an index of all industry, but as an illustration of this method of comparison. One of the merits of this form of presentation is that the various factors can be studied separately and evaluated. A composite index figure for numerous diverse subjects may cover up significant

changes, which cannot properly be considered as counterbalancing each other.

At the present time satisfactory and reliable statistics are available for only a very few industries. We have no adequate record of the changes which are taking place from month to month in the symptomatic manufacturing industries and in the wholesale and retail trades. But before we can thoroly understand the complex causes of industrial crises, we must know vastly more of the actual conditions in various industries and trades. Possibly we shall no longer have serious panics, thanks to our new banking system; but we shall unquestionably be subject to fluctuations in industry, and probably crises will recur from time to time. Measures to prevent serious depression must reach much farther than to the banking system. Altho crises are manifested most strikingly in the financial field, which serves to bind together the whole business world, they have their roots and causes in industrial conditions. Hence the sooner the collection of more comprehensive statistical records for industry and trade is begun, the earlier can we acquire a thoro knowledge of the fundamental forces which affect business prosperity.

MELVIN T. COPELAND.

HARVARD UNIVERSITY.